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Three Lichenomphalias from the Top of Gros Morne Mountain

by Andrus Voitk

Within the genus *Omphalina* there are two kinds of mushrooms—those that exist as mushrooms alone and those that exist as the fungal component of a lichen. Genetic studies of the genus showed that the lichenized mushrooms shared DNA similarity different from the rest of the genus. Therefore, Canadian mycologist Scott Redhead proposed splitting these into a separate genus, *Lichenomphalia*.

Lichens are very interesting organisms composed of two or more other organisms. One of these is always a fungus and the other(s) is/are either one (or more) alga or a cyanobacterium. The fungus is by far the major component of any lichen, gives its thallus shape, and the lichen is known by the name of the fungus. In some instances, both component organisms exist separately as well as in their combined lichenized form. Of the thousands of lichens, very few have a basidiomycete as the fungal partner. Only about 20 species are formed with agarics (mushrooms with cap, stem and gills). It seems that in these uncommon cases, over time the basidiomycete has lost its ability to live independently and is an obligate lichen component, found only in its lichenized form. The associated alga may not be similarly limited and may live independently as an alga or with a host of fungi as a lichen.

The method of association between fungus and alga varies. Some seemingly obligate "lichens" are

Fig. 2

actually not true lichens, for they are loosely associated only, with no intermingling of components—i.e., the alga grows freely and the fungus grows freely but only together with the alga. For example, *Multiclavula* cannot exist without its algal partner, although it is not structurally linked to the latter. True lichenized fungi have their algal partner(s) trapped inside a film or pocket of fungal tissue. Thus it is a somewhat unbalanced partnership: the partner that cannot exist without the other encapsulates the latter and lives off its produce.

The poor soils of barrens, including mountaintops, are preferred habitats for many lichenized agarics. Three species of the genus *Lichenomphalia* were encountered on top of Gros Morne Mountain July 4, 2006. All three are associated with the same alga,

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Fig. 1

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PRESIDENT'S MESSAGE

The NAMA Foray in Hinton is a couple of weeks away as I write this. I must admit that I'm looking forward to getting out of this late-July heat here in the Southeast and into those big mountains of Alberta.

This year's foray will be different for many of us. For one of only a few times since I became interested in mushrooms will I be at a NAMA foray without Dr. Orson Miller. He and Hope have been such regulars at the forays that you can truly say they have become fixtures. And it's not just the national forays but the NAMA regional and even club forays where you could count on spending many wonderful moments with the Millers. Orson passed away in June after becoming ill while hunting mushrooms.

I first met Orson and Hope at just such a club foray. The year was 1987, and I had been interested in fungi for only about a year when our newly formed Blue Ridge Mushroom Club invited Orson and Hope to join us in the mountains of North Carolina for our first official club foray. They jumped at the invitation. My knowledge of mushrooms at the time might have taken up one page of Orson's book—double-spaced! So here was this ignorant CPA (a term you see in the news too much these days) picking everything he saw, hoping for the chance for the man who "wrote the book" to help me identify the collection. I didn't have to ask. Suddenly there he and Hope were going through my basket, taking the time to show me every little characteristic of each of my mushrooms. While my interest in fungi had already been sparked, they truly fanned the flames.

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Lichen and diptera (photo courtesy J. N. Dell). See ***Lichenomphalias*** *article, continued on page 11.*

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Please send your new address, ***two weeks*** before you move, to

Ann Bornstein
NAMA Membership Secretary
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Otherwise—you may not be getting your newsletter for a while. Each issue, several *Mycophiles* are returned as undeliverable because of no forwarding address on file. NAMA is charged ***seventy cents*** for each returned or forwarded newsletter.

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FUNGI IN THE NEWS

By now, you've no doubt heard the sad news of Orson Miller's passing. He was among the greatest North American mycologists of all time and will be greatly missed. Ike's words echo the sentiments of us all.

On a happier note, a void has been filled in the mycological world, as our own journal, *McIlvainea,* has been reborn. By now all members of NAMA should have received their copies. I greatly appreciate all the kind words of praise I've received over the past few weeks. Most of the praise should go to Judith Caulfield as she is the reason it looks so good! I also am thrilled by all the requests for copies and author instructions from future authors. With such interest and enthusiasm from the mycological community, I'm confident that *McIlvainea* is back on track and here to stay. The next issue is scheduled for an on-time delivery in the fall. Stay tuned!

From the British Mycological Society's *The Mycologist* (vol. 20, part 2) comes a review of Albert Hofmann's life and involvement with the discovery of LSD, derived from a plant pathogenic fungus called *Claviceps purpurea* (a.k.a. ergot). The review is actually a synopsis of an article that appeared in the *International Herald Tribune* to coincide with the 100th birthday of the "father of LSD."

The same issue has a review article that I highly recommend to all those somewhat puzzled by all the discussion of DNA technology for the investigation of fungal diversity and evolution. "Sequences, the environment and fungi" by Mitchell and Zuccaro (20[2]: 62–74) discusses molecular techniques ranging from DNA extraction to PCR amplification to DNA sequence analysis, and all things in between: everything you've wanted to know but were afraid to ask.

On a disappointing note, the editorial of the same issue explains that at the end of the year, BMS will cease publication of *The Mycologist.* It will be replaced by a new journal, titled *Fungal Biology Reviews.* While I look forward to reading informative review articles in the latter, I will greatly miss *The Mycologist.* No doubt, regular features like "Mycological Dispatches" and "Profiles of Fungi" (where a different plant pathogen or other interesting garden or woodland fungus is discussed) will be dropped. Other pertinent articles will likely find a home in *Field Mycology.* Of course, this verifies the importance and timeliness of the resurrection of *McIlvainea.* I'm confident the members of NAMA will welcome all mycological refugees left stranded by *The Mycologist*'s demise.

From the Mycological Society of America's *Mycologia* comes a number of interesting articles. The Mar/Apr issue (vol. 98, no. 2) is the current one; mine arrived today.

"Species diversity of polyporoid and corticioid fungi in northern hardwood forests with differing management histories" by Dan Lindner, Hal Burdsall, and Glen R. Stanosz (98[2]: 195–217) describes how the effects of forest management on fungal diversity were investigated by sampling fruit bodies of polyporoid and corticioid fungi in forest stands that have different management histories.

Fruit bodies were sampled in 15 northern hardwood stands in northern Wisconsin and the upper peninsula of Michigan. Sampling was conducted in five old-growth stands, five uneven-age stands, three even-age unthinned stands and two even-age thinned stands, during the summers of 1996 and 1997. A total of 255 polyporoid and corticioid morphological species were identified, 46 (≈ 18%) of which could not be assigned to a described species. Ten species had abundance levels that varied by management class. Two of these species, *Cystostereum murraii* and *Rigidoporus crocatus*, were most abundant in old growth and might be good indicators of stands with old-growth characteristics. *Oxyporus populinus,* an important pathogen of *Acer* spp., was most abundant in even-age stands.

As you might expect, variability from year to year suggests that more than two years of sampling are needed to characterize annual variation. Changes in the diversity and species composition of the wood-inhabiting fungal community could have significant implications for the diversity, health, and productivity of forest ecosystems.

How many nuclei are present in a mushroom spore? Think it's a trick question? You've probably always just assumed it was one. And why would the number of nuclei per spore matter to the mushroom anyway? Thomas Horton explains (98[2]: 233–38) that the production of even a limited number of heterokaryotic spores would be advantageous for establishing new individuals after long-distance dispersal. (This strategy is analogous to self-fertilization in plants. While inbreeding is bad for the population, it can be beneficial to the species by establishing new populations after a long-distance dispersal event, which could leave an individual far away from any possible mates. Think Tom Hanks in the movie *Cast Away* here.) While *Suillus* and *Laccaria* species are known to produce binucleate, heterokaryotic spores, this condition is poorly studied for most ectomycorrhizal fungi. To begin addressing this matter, the number of nuclei in basidiospores was recorded from 142 sporocarps in 63 species and 20 genera of ectomycorrhizal (EM) fungi. The mean proportion of binucleate basidiospores produced by

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2006 NAMA Fellowship Recipient Announced

Congratulations, Bryn Dentinger! Bryn will receive $2000 and the opportunity either to contribute a manuscript for publication in *McIlvainea,* or to serve as a presenter at next year's Annual Foray.

Bryn earned a B.A. in Biology from Macalester College and in 2001 began working on a Ph.D. in Plant Biological Sciences with David McLaughlin at the University of Minnesota. Bryn has served as a teaching assistant in several courses at U of M. According to one referee, "he has the ability to turn students on to the excitement of studying the fungi" and has a "talent not only for good science but for communicating it to the public."

Bryn has been involved in several research projects, including ecological surveys of ectomycorrhizal mushrooms that examined responses to nitrogen fertilization and fire frequencies, ultrastructural analysis of subcellular characters as part of the Assembling the Fungal Tree of Life project, and molecular phylogenetic analysis of clavarioid and bolete mushrooms.

Bryn's dissertation research focuses on rates and causes of speciation in porcini mushrooms. He is the author on five publications and has won numerous awards, including a prestigious doctoral dissertation fellowship from the U of M graduate school and the 2005 Backus Award from the Mycological Society of America.

According to his referees, Bryn is "a truly exceptional student" who will be "a major contributor to mycology, a fact already becoming evident by the many publications to which he has made significant contributions."

Fungi in the News,
cont. from page 3

sporocarps within a species ranged from 0.00 to 1.00 (or 100%), with most genera within a family showing similar patterns. Basidiospores from fungi in *Amanita,* Cortinariaceae, and *Laccaria* were primarily binucleate but were likely still homokaryotic. Basidiospores from fungi in Boletaceae, *Cantharellus*, Rhizopogonaceae, Russulaceae, Thelephorales, and *Tricholoma* were primarily uninucleate, but binucleate basidiospores were observed in many genera and in high levels in *Boletus*. Further research is needed to relate basidiospore nuclear number to reproductive potential in ectomycorrhizal species.

Back to the BMS for a look into the pages of *Mycological Research.* Richard Winder's paper on "Cultural studies of *Morchella elata* " (110[5]: 612–23) caught my attention. The *in vitro* growth of *Morchella elata* was characterized with respect to the effects of a variety of substrates, isolates, developmental status of the parental ascoma, temperature, and pH. All sorts of combinations of different carbohydrates, temperatures, and other factors were tested. If you're planning to grow morels, in culture, you may want to read this article in depth. Among all these data, I found it intriguing that when calcium carbonate was used to adjust pH, optimal growth shifted to pH 7.7 or above, suggesting that wood ash and other calcium compounds may not only stimulate growth in natural settings, but may also alter the optimal pH for proliferation of *M. elata.* Of course, further studies with other substrate combinations and incubation conditions will be necessary to fully understand the connections between *in vitro* growth and the ecological behavior of the fungus.

Taylor, et al. (110[6]: 628–32) report a new fossil fungus discovery. Well, okay, it's not technically a fungus; they determined it was most likely an Oomycete (based on the putative presence of oogonia and antheridia reproductive structures).

David Moore, et al. (110[6]: 626–27) sound the alarm that there is a "Crisis in teaching future generations about fungi" and cite statistics from colleagues around the globe, showing that schoolchildren are not being taught anything about fungi other than that they are decomposers and degraders. (The fungi, not the children.) In many surveys, from several different countries, most people thought fungi and bacteria to be the same organisms. It's time to redouble our efforts! I think that education of the public should begin at the club level. Club members—get out there and spread the word about fungi!

From *Genetics* (171[1]: 101–8) comes a paper by a team of researchers that has found that the inky cap mushroom, *Coprinus cinereus,* exhibits remarkable photomorphogenesis during fruiting-body development. That is, the fungus needs light to make mushrooms. Under proper light conditions, fruiting-body primordia proceed to the maturation phase in which basidia in the pileus undergo meiosis, producing sexual spores, followed by stipe elongation and pileus expansion for efficient dispersal of the spores. And if there's no light during mushroom formation? In the continuous darkness, the primordia do not proceed to the maturation phase but are etiolated: the pileus and stipe tissues at the upper part of the primordium remain rudimentary and the basal part of the primordium elongates, producing "dark stipe." In this study a gene called dst1 was discovered and may code for a blue-light receptor of *C. cinereus*. Illuminating!

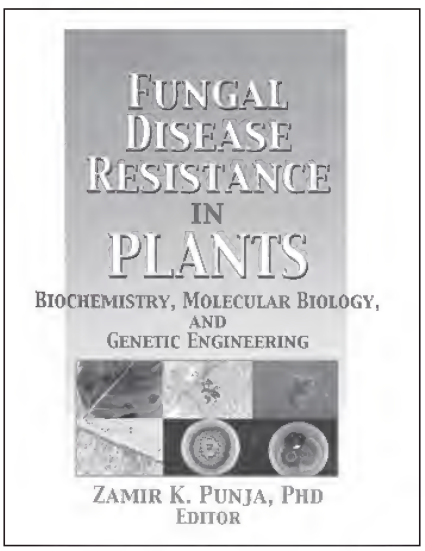
Mushroom Identification Trilogy Available

Taylor Lockwood's entertaining visual guide to mushroom identification explains all the basics with photos, illustrations, and video footage of real mushrooms. DVD (approx. 1 hr.) includes Introduction, Into the Details, and Into the Woods. QuickTime preview at www.fungiphoto.com/treasurechest/MIT/mit.html. Reviewed in Mar/Apr '06 Mycophile.

Fungal Disease Resistance in Plants: Biochemistry, Molecular Biology, and Genetic Engineering. Zamir K. Punja,ed. New York: Haworth, 2004. ISBN 1-56022-960-8

The diversity of fungal plant pathogens is mind-boggling. And yet, most of the time, plants are able to withstand the onslaught of would-be invaders. Throughout history, pathogen resistance has broken down with noteworthy or even catastrophic results. How plants are able to fend off fungal invasion—and how research has led to enhanced resistance in plants—is the topic of this highly informative book. Plant pathology graduate students and professionals alike will find *Fungal Disease Resistance in Plants* a very useful and illuminating book. Up-to-date, accurate information on recent developments in crop protection is discussed in topical chapters written by experts in the field.

Fungal Disease Resistance in Plants highlights the various barriers that plants have evolved to protect themselves from invading fungal pathogens. These defenses include physical barriers such as thickened cell walls and chemical compounds expressed by the plant when attacked. Still other plants have acquired proteins that play an important role in defense. *Fungal Disease Resistance in Plants* discusses these evolutionary traits and introduces new scientific techniques to engineer resistance in plants that have no such protection. The editor, Zamir K. Punja, currently editor-in-chief of the *Canadian Journal of Plant Pathology,* is to be congratulated on assembling a who's who of leading experts in botany, plant breeding, and plant pathology who share their knowledge of the latest developments in crop protection from fungal infection to help reduce and possibly prevent new outbreaks of devastating crop epidemics caused by fungi, and fungi-like organisms.



Without intense research and scientific study, catastrophic harvest failures due to fungal diseases will continue to cause food shortages, human and animal poisonings, and economic loss throughout the world. On-going research in this field is important and timely—new and emerging fungal diseases of plants continue to wreak devastation on forest and other economically important plants (recent examples include sudden oak death, soybean rust, and karnal bunt).

What I like most about this text is that each chapter begins with a general introduction to a special subject, followed by a comprehensive overviews of current issues surrounding the subject, then discussion of key advances and the current state of knowledge for the topic. Topics covered in the chapters of *Fungal Disease Resistance in Plants* include cellular expression of resistance to fungal pathogens; the hypersensitive response and its role in disease resistance; induced plant resistance to fungal pathogens—mechanisms and practical applications; pathogenesis-related proteins and their roles in resistance to fungal pathogens; signal transduction—plant networks, delivery, and response to fungal infection; and fungus genes as they relate to disease susceptibility and resistance.

With its exciting new advances in molecular biology, biochemistry, and genetic engineering, this informative book will help researchers, professors, and students further their understanding of plant defenses. —*Britt A. Bunyard*

[*This article originally appeared in MSA's* Inoculum *(57[1]:18–19). It is reprinted here with permission.*]

Fungi in the News, cont. from page 4

The spring 2006 issue of *Mushroom the Journal* has been out for a while now. I was relieved to read that Leon has finished his other business (he recently earned a Ph.D. in music from the University of Chicago!) and will have that magazine "back on a normal schedule from here on out." As always, *MTJ* is packed with interesting and enlightening reads. There is a story on "Heavenly Hedgehogs" with several accompanying recipes. The fun stories on poisonous mushroom lore kept me riveted. Larry Evans makes a strong case in "How to Harvest a Forest" for the preservation of forests. It makes financial sense, as the mushroom harvests (in the West, anyway) are worth more money than the harvested timber. And no ugly clear cuts are left as a result of mushroom harvesting. I was enthralled with "Mushroom-hunting with Headhunters," an encounter with mushrooms in Borneo. Then there's the ever-entertaining ramblings of Maggie Rogers in "Keeping Up," mushrooms stamps from around the world, and a crossword puzzle. If you don't subscribe to *Mushroom the Journal* you're missing out on the best mycological magazine out there! —*Britt*

Mushroom Cultivation . . . in a Glovebox!

by James Tunney

I live in Pittsburgh, Pennsylvania, and am a member of the Western Pennsylvania Mushroom Club. As a walk identifier, I can safely identify about 120 species of mushrooms. I am also the chairman of the Educational Committee for the club.

I have had an interest in mushrooms since I was a child. There was a Golden Guide mushroom book in our house when I grew up. Mostly, I just looked at the pictures in this book; I learned what a *Russula* was and a few other genera, as well, from having it around.

In the summer of 1996 I started looking for mushrooms, with a borrowed copy of the *Audubon Field Guide* by Lincoff. About nine years ago I bought a few other field guides, including *The Mushroom Cultivator* by Stamets. I read it and in the back of the book found a list of possible contaminants. The list at the back of the book is something you don't want to dwell on if you are going to grow mushrooms. Thinking about that list delayed my culture work for, like, five years. I gave away my copy of *TMC*.

I grew a few things in the meantime with kits: shiitake and oysters. I grew blewits and shaggy parasols by adding the bases to mulch. I grew oyster by adding pieces of oysters to coffee grounds and reishi by adding pieces of it to a plum stump.

I bought another copy of *TMC* and started playing with agar in baby-food jars. I use baby-food jars for agar mostly, as it eliminates one place contamination can occur: pouring plates. If you don't have a flow hood, I recommend this technique. Last year I gave a talk at one of the club meetings and demonstrated how I do transfers in a glovebox using agar in baby-food jars. I'm hoping more people in the club do some cultivating.

Pleurotus djamor *on cardboard and cocoa hulls in a milk carton.*

Pleurotus *on cottonseed hulls.*

What I like most about mushroom cultivation is getting a new (to me) species to fruit. (What I don't like is when one won't fruit!) If I did not care so much about failing at this, it wouldn't be as much fun.

Starting from either a clone or spores, and getting it to fruit

So what have I successfully cultivated? I have grown *Pleurotus ostreatus* on coffee grounds, cardboard, tea, straw, cottonseed hulls, and logs; *P. eryngii* on cotton seed hulls; *P. djamor* on cotton seed hulls, cardboard and cocoa hulls; *Panellus seratonus* on sawdust and straw; *Panellus stipticus* on sawdust and maple logs; *Grifola frondosa* on grain and agar; Shiitake on grain; *Hericium* on sawdust; *Agrocybe aegerita* on cottonseed hulls; *Lepista nuda* on leaf mold outside; *Hypsizygus tessulatus* on sawdust and buried cardboard; *Stropharia rugosoannulata* on wood chips, stable bedding, and straw. Additionally, I've tried to grow three times this many species.

Last winter I grew some mushrooms I thought were going to glow in the dark. I wanted to have some glow-in-the-dark mycelium to give to my nephews at Christmas. A friend gave me culture of *Panellus stipticus* on agar. I transferred it to more agar jars after I received it. Then I inoculated some wood shavings mixed with bran in mason jars that had been sterilized. None of the cultures—neither the ones on agar nor the ones on wood shavings—glowed. I told my friend about it, and he said that they were *P. stipticus,* which did not glow in the dark. This I could not accept, because every time I have found one and checked it to see if it glowed, it did.

Pleurotus eryngii *on cottonseed hulls.*

Pleurotus *on cotton seed hulls.*

Panellus serotinus *on sawdust in pint container.*

Hypsizygus tessulatus *fruiting on straw.*

Stropharia rugosoannulata *mycellium on chipped spruce in a box.*

When spring came around, I had gotten rid of some of the cultures, but I still had a few jars on wood shavings. The wood shavings cultures looked happy so I inoculated an 18"-long maple log 4" in diameter with some of the colonized shavings. I cut the log halfway though in four places with a chainsaw and stuffed the shavings in the cuts, then wrapped duct tape around the log and over the cuts and shavings to protect the mycelium from drying out. This was in late spring.

In the fall (five and a half months later) I found some fruits on the base of the logs. There had been a couple of frosts, so I was sort of surprised to see them. The log was in tall grass, though, so it was somewhat protected from the weather. I posted some pictures on the NAMA Yahoo cultivation site and said that since it didn't glow, I thought it was *Panus rudis.* I had already been told once about it not glowing in the dark; sometimes it takes me a while to catch on. A member of the group said that it looked like *Panellus stipticus* and that some races of *P. stipticus* did not glow. Another member agreed with him. I measured the spores; and turns out they were indeed *P. stipticus.*

Agar jars in pressure cooker.

All you need are baby-food jars and a glovebox

I have provided two pretty standard recipes for agar media for growing mushrooms in Petri dishes (see page 9). The ingredients are poured into a narrow-mouthed, closed but vented container (like a flask) and sterilized in an autoclave for 35–45 minutes. Then you take your sterilized media and pour it into your Petri dishes in a sterile environment like a flow hood or a still-air environment like a glovebox.

When I first started growing mushrooms, I was looking for an alternative to Petri dishes. I came across this technique growing in baby-food jars. A few people had mentioned to me that agar could be done in jars, and when looking for the best way to make and use a glovebox, I found a site on the web that described using baby-food jars to start orchids on sterile agar media. I really like this technique. It eliminates the need to pour plates (agar-filled Petri dishes). Pouring plates is THE step where mold spores or bacteria can get into your media and contaminate it. I use the same recipes that would be used for pouring plates. Instead of pressure-cooking a flask, I put the ingredients into a pot and heat till the agar is dissolved. Next I pour about 1/4 to 3/8 inch of media into a jar. I puncture holes in the metal lids and

Kitty and pressure cooker.

Wine cap on wood chips and straw.

Wine cap with two-liter bottle.

Blewit on straw.

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Recent Additions to the Mycophilic Library

Here is a helpful (I hope) index of all the books and other media reviewed in The Mycophile *since I became editor four years ago. The list is alphabetical by author. If you cannot find a back issue of* The Mycophile *with a review of interest to you, send me an e-mail and I will see that you get a copy of the review. My thanks to all the reviewers and especially Steve Trudell, who has handled about 95% of the load! —Britt*

Fungi non Delineati: Raro vel Haud Perspecte et Explorate Descripti aut Definite Picti. 26-volume series, individually priced
Edizioni Candusso, Via Ottone Primo 90, I-17021-Alassio-SV Italy; e-mail <maxcandusso@libero.it>
http://edizionicandusso.it
Reviewed Sep/Oct 2004

Fungi in Forest Ecosystems: Systematics, Diversity, and Ecology, ed. by Cathy L. Cripps
2004. Volume 89, Memoirs of the New York Botanical Garden. NYBG Order #MEM-89; eee.nynh.oth
ISBN 0-89327-459-3
Reviewed May/June 2005

Fungi of the Antarctic: Evolution under Extreme Conditions, ed. by G. S. de Hoog.
Studies in Mycology 51:1–79.
2005. Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands
ISBN 90-70351-55-2
Reviewed July/August 2006

Fungi in Ecosystem Processes, by John Dighton
Mycology Volume 17
2003. Marcel Dekker, Inc., New York; www.dekker.com
ISBN 0-8247-4244-3 (hardbound)
Reviewed July/August 2006

Fungi Fimicoli Italici, by Francesco Doveri
2004. Associazione Micologica Bresadola, Fondazione Centro Studi Micologici dell'A.M.B., P.O. Box 296, 36100 Vicenza, Italy
Reviewed Sep/Oct 2004

***Die Pilzflora des Ulmer Raumes* (*Fungus Flora of the Ulm Area*),** by Manfred Enderle
2004. Order from www.manfred-enderle.de/pilzbuch.htm
ISBN 3-88294-336-X; 521 pp
Reviewed Sep/Oct 2005

Fungal Boogie, by Larry Evans and Zoe Wood
year. Fungal Boogie, P.O. Box 7306, Missoula, MT 59807
Reviewed July/Aug 2005

The Secret Lives of Mushrooms: An Interactive CD-ROM, by Joel Greene
2002. Toadstool Workshop, P.O. Box 1853, Flagstaff, AZ 86002; www.toadstoolworkshop
Reviewed Nov/Dec 2003

Edible and Poisonous Mushrooms of the World, by Ian R. Hall, Steven L. Stephenson, Peter K. Buchanan, Wang Yun, and Anthony L. J. Cole
2003, Timber Press, Inc., Portland, OR
ISBN 0-88192-586-1
Reviewed May/June 2004

Common Mushrooms of the Talamanca Mountains, Costa Rica: Memoirs of the New York Botanical Garden, Volume 90
Roy E. Halling and Gregory M. Mueller
2005. NYBG, New York, NY
ISBN 0-89327-460-7; 195 pp
Reviewed Mar/Apr 2006

Edible Mycorrhizal Mushrooms and Their Cultivation. Proceedings of the Second International Conference on Edible Mycorrhizal Mushrooms (CD-ROM), ed. by Ian R. Hall, Wang Yun, Alessandra Zambonelli, and Eric Danell
2002. New Zealand Institute for Crop and Food Research, Ltd., Christchurch; www.crop.cri.nz/psp/products/Emushroom.htm
Reviewed Nov/Dec 2003

Tanzanian Mushrooms: Edible, Harmful and Other Fungi. *Norrlinia* 10:1–200.
Marja Härkönen, Tuomo Niemelä and Leonard Mwasumbi
2003. Secretary of the Botanical Museum, P.O. Box 7, University of Helsinki, Helsinki, FIN-00014 Finland
Reviewed May/June 2004

The Grim Grotto* (*A Series of Unfortunate Events, Book 11*) *by Lemony Snicket, by Brett Helquist
2004. HarperCollins
ISBN 0-06-441014-5
Reviewed Mar/Apr 2005

***Fungi of Switzerland, Volume 6* (Russulaceae),** by Fred Kränzlin
2005. Edition Mykologia Lucerne
ISBN 3-85604-260-1 (Eng.); 317 pp
Reviewed July/August 2006

Morels, by Michael Kuo
2005. The University of Michigan Press, Ann Arbor
ISBN 0-472-03036-1; 206 pp
Reviewed May/June 2006

The Advance of the Fungi, ed. by E. C. Large, with new introductory material by Karen-Beth Scholthof, Paul D. Peterson, and Clay S. Griffith
2003, APS Press, St. Paul, MN
ISBN: 0-89054-308-9; 488 pp
Reviewed Nov/Dec 2004

Carpet Monsters and Killer Spores: A Natural History of Toxic Mold, by Nicholas P. Money
2004, Oxford University Press
ISBN 0-19-517227-2
Reviewed Mar/Apr 2005

Flora Agaricina Neerlandica* (*Mushroom Flora of the Netherlands.* Vol. 5: *Agaricaceae, ed. by M. E. Noordeloos, Th. W. Kuyper, amd E. C. Vellinga
2001, A. A. Balkema Publishers, Rotterdam
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Reviewed Mar/Apr 2004

Cultivation, continued from page 7

melt holes in the plastic lids about 3/16 of an inch in diameter that act as vents for air exchange for the culture. The hole is either stuffed with polyfill stuffing or taped over with tyvek. (Plastic lids should be #5 plastic, which can withstand the temperatures of 15 psi. Both tyvek and polyfill can withstand the temperatures of sterilization.) Lids are put on the jars. Jars are then put in a pressure cooker or autoclave and pressure-cooked at 15 psi. for 15 to 20 minutes. Once the jars have cooled, the media in these jars can be used to grow cultures by cloning from a fresh mushroom, transferring from another culture, or by adding spores to the media. Instead of baby-food jars I now use 8-oz. jars with screw lids. I found the problem with the baby-food jars was that while the lids on baby-food jars screw off easily, they need to be pressed down to be sealed and they don't screw back on easily. This pressing-down motion can cause turbulence in the air of the glovebox, which is not good.

[*James can be reached at* <*aminitam@hotmail. com*>.]

Standard agar media recipes

#1 500 ml of water
10 grams of potato flakes
10 grams of agar
2 grams of fructose
1 gram of nutrayeast

#2 500 ml of water
10 grams of malt
10 grams of agar

Regional NAMA Foray
Wildacres, North Carolina
September 28–October 1

Information and registration form can be found in the July/Aug issue of THE MYCOPHILE or at the NAMA Web site, www.namyco.org. For additional information contact Allein Stanley at <wildacres@namyco.org>.

Breitenbush Mushroom Conference
Detroit, Oregon
October 8–11

The 2006 Mushroom Conference at Breitenbush Hot Springs Resort in central Oregon, near Detroit, will feature the edible mushrooms of the Pacific Northwest. Our expert mycologists will teach you how to positively identify the more delicious mushrooms, and our expert chefs and mycophagists will teach you how to prepare and preserve our delectable forest and field fungi. Guided field trips, lectures, cooking and preservation, and mycopyrography demonstrations will fill the time between sessions of soaking in the hot waters of the natural springs. The practitioners of healing arts at Breitenbush can soothe your tired muscles after hiking to collect fungi for both the identification and dinner tables. Treat yourself to an educational, delicious, and relaxing autumnal event in the midst of the old growth forests of Oregon!

Reservations and information can be found on the Web site (www.breitenbush.com), or call 503-854-3320 Monday through Saturday, 9 a.m.–4 p.m. Reservations are required for overnight stays and day use. Costs of the mushroom conference are $145 plus three days lodging. Breitenbush rates vary with the type of cabin requested. For general information by e-mail write <office@breitenbush.com>. Please indicate your phone # in your e-mail.) For further information about the conference e-mail or call Patrice Benson at <patrice.benson@comcast.net> or 206-819-4842.

Laos in October 2006

An exciting two-week foray to exotic Laos is planned for late October! For more information about the tour, including proposed itinerary, see the May/June MYCOPHILE or e-mail <mushroomtourlaos@gmail.com>. *Please note that biological material cannot be removed from Thailand or Laos without prior permission.*

Thailand Mushroom Ecotour

For more information e-mail Dr. Edward Grand at <edwardgrand@yahoo.com>, visit the Web site (www.mushroomresearchcentre.net), or see the March/April 2006 issue of THE MYCOPHILE.

Ike's message, cont. from page 2

Orson will without a doubt be greatly missed at the forays, especially by those of us attending the Trustees' meeting where his calm, level-headed approach to each problem always helped steer the discussions and decisions in the right direction.

I never forgot that first meeting and how much Orson and Hope made me feel like an old friend—something many of us can say, I'm sure. I've had the privilege of many forays with Orson and Hope since that day, and I'm sure that whenever I'm in the woods, mushroom basket in hand, a big part of the experience can be traced back to a remembrance of something Orson showed me or said. He's not really gone. —*Ike*

Hope and Orson Miller with Cathy Cripps. Photo courtesy of S. Trudell.

Lichenomphalias, continued from page 1

Coccomyxa. All are white-spored mushrooms with a similar (omphalinoid) appearance—dimpled, wavy cap, decurrent gills, central stem. Our commonest *Lichenomphalia* is *L. umbellifera* (a.k.a. *Omphalina umbellifera*, *Omphalina ericetorum*), found uncommonly in our woods and commonly on barrens. In richer habitats, it is considerably larger and lusher. Figure 1 shows some found on the trail to Gros Morne Mountain in 2003. Figure 2, photographed on top of Gros Morne Mountain, shows the smaller specimen typically encountered on the barrens. Color varies from nearly white to tan, the latter being more common on barrenland specimens; the stem is usually darker than the cap. The lichen thallus is a crust of green granules. If it grows on bare soil, the crust may be extensive, but in moss or other vegetation it is often not noticeable, as in the illustrations. It is found from early spring to late fall, but less commonly during the warmer part of late summer. It is a very Canadian mushroom, with a circumpolar distribution, roughly north of the 49th parallel. Most striking of the three is *L. hudsoniana* with its white stem and yellow cap (Figure 3). Its foliose, green, scaly or leaf-like lichen thallus, seen at the foot of the specimen on the left, is diagnostic. By convention the lichen bears the name of the fungus, but before the connection between this thallus and *L. hudsoniana* was known, the thallus was known as *Corsicum viride,* and it can be found still under that name in most lichen books.

A bit smaller in stature with a shorter stem is *L. alpina* (Figure 4). This mushroom is a deeper or more orange yellow, superficially resembling a tiny chanterelle in color and shape. Cap, gills, and stem are the same color. Its lichen thallus resembles that of *L. umbellifera,* a green granular crust, called *Botyrodia vulgaris,* well seen in the photo. Both yellow *Lichenomphalias* fruit in the early summer with a range considerably more northerly than *L. umbellifera.* The classical habitat for both is alpine, on top of barren mountains, more so for *L. alpina* than *L. hudsoniana.* Both are also found in heaths along coastal barrens and on barren northern coastal islands. Both are common finds in July along the Labrador coast, *L. hudsoniana* somewhat more southerly than *L. alpina*.

Fig. 3

Fig. 4

Of these three, *L. umbellifera* is the only one that exists outside the specialized habitats and is therefore the only one of the three to have made it into mainstream mushroom books. This is not because the others are not common—no, they are quite common in the described season and habitat. and because we have a lot of both coastal and alpine barrens, they are very common mushrooms in Newfoundland and Labrador. Most people have not seen them because most people don't look for small mushrooms in the summer on top of mountains or on barren coastal islands. They have not made it to mushroom books because authors of same are remarkably uncommon in said habitats.

Most people consider them uncommon to rare and somewhat exotic. Mycophiles are thrilled to encounter these pretty mushrooms, and many are willing to bear the cost of significant travel to do so. We are privileged to enjoy access to them and have something worthwhile to offer to mycophiles the world over. These little treasures are worth preserving and cherishing.

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THE MYCOPHILE

Mushroom of the Month

This month's photo of oyster mushrooms fruiting from a burlap sack comes from Paul Stamets's terrific book *Mycelium Running.* For an interesting twist on cultivation techniques, dig into this issue!